

PART I: Calculation (If you have passed the midterm you can skip this part. You may try to increase your points from the midterm in which case the better result of those two will be credited in the final grading.)

1. You are bearish on Deutsche Telecom Stock and you decide to sell 100 stocks short at the current market price of 50 per share.
 - a) How much in cash or securities must you put into your brokerage account if the brokers initial margin requirement is 50% of the value of the short position?
 - b) How high can the price of the stock go before you get a margin call if maintenance margin is 30% of the value of the short position? 15p
2. Assume that the risk-free rate of interest is 4% in the U.S. and 5% in the U.K.. The current exchange rate is \$2 per pound. What is the arbitrage free futures price for a 1-year contract? Set up an arbitrage strategy and calculate the associated profits if the initial futures price were \$2.01 per pound. 15p
3. A stock price is currently 50. Over each of the next two six-month periods it is expected to go up by 20% or down by 10%. The risk-free interest rate is 5% per annum with continuous compounding (If you do not remember how to calculate p , then assume it to be 0.5).
 - a) What is the value of a one-year European call option with a strike price of \$55?
 - b) What is the value of a one-year American put option with a strike price of \$55? 20p

PART II: Theory

1. Briefly explain the following words and expressions
 - a) Daily settlement
 - b) VIX-index
 - c) Modified duration
 - d) Open interest
 - e) Hair cut 10p
2. Briefly (no more than 10 lines / answer!) answer the following questions. Remember to explain your answers!
 - a) Why are U.S. Treasury rates significantly lower than other rates that are close to risk free? Give to reasons.
 - b) Describe one advantage, and one disadvantage of including callable bonds a portfolio.
 - c) The prices of long-term bonds are more volatile then prices of short-term bonds. However, the yields to maturity of short-term bonds fluctuate more than yields on long-term bonds. How do you reconcile these two empirical observations?
 - d) Evaluate the criticism that futures markets siphon off capital from more productive uses.
 - e) According to the Black- Scholes formula, what will be the value of the hedge ratio of a call option as the stock price becomes infinitely large? 20p

When answering the following two essay-type questions, start with a table of contents!

3. Theories on the relationship between future prices and expected future spot prices. (Hull, 121-123, BKM 685-687) 10p
4. Derivative mishaps and the lessons to be learned: what lessons are primarily relevant to non-financial institutions? (Hull ch. 35.3) 10p

$$\begin{aligned}
 c &= S \times N(d_1) - Xe^{-rT} \times N(d_2) \\
 p &= Xe^{-rT} \times N(-d_2) - S \times N(-d_1), \quad d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)T}{\sigma\sqrt{T}} \\
 d_2 &= d_1 - \sigma\sqrt{T}
 \end{aligned}$$